

Before The Federal Communications Commission
Washington, D.C. 20554

In The Matter Of: Rule Making: For A Low Powered AM Broadcasting Service	RM_____
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Petition For Rule Making

Dannie R. Jackson and the Part 15 Design Group of Yahoo Groups hereby respectfully requests that the Commission issue a Notice of Proposed Rule Making at the earliest possible date in the matter of creating a Low Powered AM Broadcasting Service and that public comments be received and reviewed along this this matter. This proposal for rule making is for a licensed service of the "commercial radio kind" that is envisioned to operate within the Rural Band Segment of the Mediumwave Broadcast Band between 1600 and 1710 kHz. At a power level of up to 35 watts with antenna heights of up to 9 meters. And be open for any future expansion of the band past 1710 kHz. Where numerous parties have requested that such a service be a "*corporation free zone*" allowing for more diversification and removal of barriers that disenfranchise many interested individuals from owning and operating a station as they have envisioned as private individuals. Furthermore this proposed service shall not be structured upon the Low Powered FM service as an example nor based upon the Low Powered FM Service vision, wherein herein "commercial radio enterprise" is not to be construed to mean a corporate neither small business entity. Neither shall the service be used as a secondary service for translator stations for good reasons; as some among our peers have suggested such a service could be used for. Furthermore some interesting technical specifications are suggested for this service in order that it be made to run cleanly and smoothly with little problems.

This petition was prepared by D.R. Jackson 130 Laurel St, Pineville KY 40977 on behalf of him self and the Part 15 Design Group as well as other groups devoted to Low Powered AM at Yahoo Groups of which we are or have been members of.

The following listed topics and pages detail the suggested rules that may be made to create a service that should work well following the suggested technical specifications for use in the service that this Petition For Rule Making suggest.

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There at 19 pages altogether in this petition.

For A Low Powered Mediumwave Broadcast Service

1. Forward

This proposal is meant to be concise and focused upon the relative points of interest. The matters of concern herein have come to the petitioner and proposal makers attention first through comments reflected on shortwave broadcast station talk shows since about 1998, as well as in various blogs, groups and forums and do not represent any one group but a diversity of private sector interest. And so this does not focus upon the interest of any corporate based groups or entities, but rather the average individual's interest in Low Powered AM Broadcasting. Representing what appears to be a sizable and diverse group of individuals who feel their interest have either been neglected or have gone unnoticed due to the vast arena and group of broadcast and tax exempt corporations and their closely akin media and broadcast associations.

2. The Real Need For A Low Powered AM Service

(a.) The need for a Low Powered AM Service (of from 15 watts up 35 watt class of transmitter) is based upon two complaints and is not for those who want to have fun, although they can do so with such a service, nor for those who want to gain radio experience although this can be done also and all of this is fine, and will no doubt be some of the reasons some individuals will obtain a license if such a service is created, and again all of this is fine; the first complaint for such a proposed service is for an outlet for those who's long time complaint has been about free speech issues and mega corporation owned and controlled media and radio networks. Hence this proposal addresses those who feel and believe that the existing broadcast service on Mediumwave as well as the vision of how the Low Powered FM service is structured has disenfranchised them, and hence want a place for their vision within the Rural Segment of the Mediumwave Broadcast Band. The first need then is for a non corporation owned (and controlled) radio service that is locally owned and based. Where the license owner can only have one license and thus is only eligible to have one

licensed station in the United States and its possessions. If more than one license were allowed someone could easily obtain more than one station in a single location or across the United States and hence, begin to gain control of the dialog and vision reflected within this proposed service, just as corporation owned and run media is currently doing through their vast networks. Thus the need for more diversity of views (more diverse freedom of speech outlets) would be squelched by corporations who want to obtain and or maintain national mainstream dialog control (control of the national narrative as well as vision of the service). Hence diversity is the key word.

(b.) The second complaint is for a return to some sort of more personal kind of radio operation that is not automated and that can return to providing regular weather reports and local news, as well as some home spun kinds of talent and broadcasting and hence provide a community service, where larger stations through automation have replaced dj's with software and their live information which can include live emergency weather notifications, are no longer featured. Whereas in automated radio stations you hear mostly software selected music and automated advertisements. This view however should not bar any low powered AM station from using a feed from any media network on satellite or Internet that their station wants to feature, where such feeds may run several hours to most of the day. However the number one issue and hence complaint for needing a Low Powered AM service is for a corporation free zone which is also devoted to diverse free speech issues, which may not follow along with mainstream corporation spun narratives. Wherein via such a proposed service the disenfranchised portion of interest would no longer be barred from pursuing their vision and message amid the national dialog and narrative established by mega corporation owned outlets, and hence is mostly controlled by the mega corporation media networks. rather than by lets say we the people. * With regards to *tax exempt corporations*, since such corporations can easily obtain a local radio station license for a station of the 1 kilowatt class of transmitter or obtain a Low Powered FM License and or obtain air time on many local radio stations. Such corporations do not have a financial resource problem with finding an outlet for their vision and purpose of wanting or needing to be on the airwaves since they receive direct public funding through contributions. And therefore are not disparaged and or are not finding any resistance or hardship with regards to their desire or need to propagate their message through their local radio stations, and in some cases they own the stations. Being that such non profit corporations have their tax exempt status to help them generate finances for their programs and projects and can afford higher power class radio stations of which they do daily across this nation. And hence again this class of service we propose should only be to those with no corporation affiliation whatsoever. Therefore the license is to non corporate locally owned stations run by private individuals where this service is a corporation free zone, wherein such stations can be commercial in nature selling advertising and broadcast airtime.

3. Low Powered AM Stations Not To Be Considered A Small Business Venture

Since such proposed low powered stations do not use enough power to constitute a requirement for considerable income to maintain the power bill, such as a 50 kW or ...

100 kW station, and thus can be run by a single individual. Where the individual may use Internet and or satellite audio resources from new and budding alternative media networks (if they have such interest) for finding resources for interesting talk shows and various genres of music as well as educational or religious, and or science and technology broadcast. Many of these stations will be run as non commercial, unsupported stations manned by a single volunteer or two. However this should not be construed to bar anyone who may want to carry commercial broadcast materials such as advertisements for local businesses. And such licensees should not be required to have a business plan for such proposed low power stations, nor be considered to be a business since many will not be, however such stations may evolve in time to find means of revenue and income and thus can in time become a small tax paying operation, therefore commercial advertising should be allowed, likewise some of the media networks will have advertiser spots carried on those networks of which although aired by such proposed stations do not provide any revenue or rather income to those stations who are merely rebroadcasting those media network feeds. Hence the licenses should go to individuals who may or may not come to operate a “non corporate” commercial radio station enterprise.

4. Enabling New And Future Media Venues

The interesting matter about this proposed service is that it will allow for Internet based broadcasters to be carried in some local venues via radio and thus may enable the emergence of new media networks with new visions of what radio and perhaps television, can one day be used for, such as for more educational and informative kinds of media. This then would mean more diversification.

5. Non Shared Channel Status And No Translator Stations In This Service

Since this is a licensed service that is being proposed, the interest of the majority of those who want to operate a station is for full time 7 days a week service, without local channel sharing with any other entity; lets say on weekends or Sundays. It is the view of many that if this were done, the only interested parties who would want to do this would be tax exempt religious corporations, then the vision and purpose of a corporation free zone would be diluted. Instead if any non profit corporate entity wants to come to a low powered station and obtain payed air time, then this would be preferred by us interested parties. And likewise provide some revenue for the stations in this service. Hence if non channel sharing is the rule then the service is less complicated from the start. And will result in one less matter to resolve problems with. Neither shall it be used for translator stations which can over run the service if allowed.

In some views proposed by other individuals and institutions who have voiced their vision of what a Low Power AM Service could look like, there was a notion about inventing AM Translators in this proposed service that operate on the Mediumwave broadcast band much like those which operate on the FM broadcast band. In review of the necessity of such a service, it made no sense seeing how that it is AM stations on ...

Mediumwave that desire to have a FM Translator station on the FM band.

If the vision of those who advocated this was to somehow provide a translator for existing licensed AM stations within their "service contour" but on a different frequency or for FM station use on Mediumwave, it would not do this service any good to be over taken with such services since the need for this service as stated in the beginning of this petition is to provide for more localized and privately owned radio station visions, where the service is not controlled by corporate visions and ownership. And thus promoting more diversity in terms of views and opinions, as well as in terms of genre of broadcast whether music, educational, political or religious, where a station could if they so desire air religious broadcasting but only do so via media feeds or by providing broadcasting air time payed for by the individual desiring to have their broadcast aired on such a station, where the station is not a tax exempt corporation nor owned by an individual acting on behalf of a tax exempt corporation.

6. Considerations For Recommended Power Level And Antenna Height And Related Technical Matters

Upon consideration of the performance of the Part 15 Class of service and its area of coverage as well as antenna size, it is considered that a Low Powered Class Of Service of the range of from 15 up to 35 watts by way of Class C biased (vacuum tube or transistor) transmitters, with a vertical antenna of up to 3 times the height of the Part 15 specified antenna (3 meters x 3 = 9 meters) should be an effective enough service for the vision that most people have. At a recommended maximum height of up to 9 meters (slightly less than 30 feet), the performance of the antenna should be sufficient enough at the asked for range of power (up to 35 watts) to cover most small towns and rural communities within the station's radius, without such stations causing interference with other stations of the same class of service located on the same frequency in nearby rural areas and towns. Of course a proper channel search should be done by the applicant in order to find an open channel in their area and thus not be assigned to a channel that does have another low powered station on it elsewhere in a radius of 12 or perhaps 15 miles. Wherein also the stations must allow for some interference at their signal's fringe areas.

Additionally if there is a higher power class station on the specified channels in the region then the radius to such stations should be at least 35 miles or more if that channel is desired to be used. But this would only be the case if there were several stations operating in a region where there is competition for channel space.

(a.) ~ Radiation resistance of a 9 meter radiator for use on Mediumwave calculated at 1650 kHz with an aluminum radiator of 1 inch diameter. As computed using MMANA GAL antenna plotting software.

0.9112 ohms @ 9 meters length

Since the ground resistance consumes most of the power input into such extremely ...

short height antennas, and the ground resistance is never truly ideal or lets say, the best across the United States, and can be several hundred or more ohms in some places. You can easily see that for power inputs of 100 mW as specified by Part 15 with its 3 meter high antenna and the 35 watts proposed for Low Powered AM, result in the reality that the actual radiated power in the near field *in this proposed service* will be less than 1.5 watt locally. As an example lets look at the 9 meter vertical above compared to a feed point ground resistance of 25 ohms (considered to be very good ground), via the ratio of power across each resistance:

$$(0.9112 \text{ ohms} / 25 \text{ ohms}) * 35 \text{ watts} = 1.276 \text{ watts radiated into the near field.}$$

Where 33.724 watts is dissipated across a ground resistance of 25 ohms.

This is the reality, and in allot of cases the ground resistance will be much higher, it would be inconceivable for some of our current licensed stations of higher power to envision that this service would provide undue interference with their service, especially since the idea of a FCC controlled service means channel allocations that result in minimal to no interference.

Also at this moment in this discussion it should be said that part of this proposal details the use of circuits that limit the negative modulation peaks of the transmitters we suggest be used in this service as type accepted, which means that the negative peaks of the AM modulation can be adjusted independently from the positive modulation peaks producing some degree of asymmetry that will prevent negative peak clipping and the resultant undesired RF byproducts that negative peak clipping produces. Hence the transmitters that will be suggested for type acceptance will employ such simple and inexpensive modulation circuitry, or conventional controlled carrier modulation circuits. The circuits recommended for this have been used by Amateur radio operators as well as are now being used by CB radio operators to help control the tendency for AM modulation to clip the negative peaks long before the positive modulation peaks are clipped. Circuit diagrams about this will be shown in another section of this petition. For the moment we will say that this will make some simple low powered transmitters more high tech and capable of performing unlike others have in the past (carrier current types of transmitters used by colleges) easily meeting with more stringent specifications than such transmitters currently available have provided those who invest in them.

(b.) Antenna Capacitance Hats: Many of those of whom the author of this petition has discussed these proposals with in the past, have voiced a desire to recommend that a Low Powered AM Broadcasting Service be allowed to use capacitance hats atop their antennas to improve the current flow through the radiator to increase its efficiency.

(c.) Ground Based Antenna Constructions: This service desires to eliminate problems from the beginning of the service so that the operation of this service be smooth for the most part, and therefore suggest that all antennas be mounted on the ground and hence shall not be mounted above ground on mast or towers nor atop buildings. This will ensure that a station's signal remains respectively confined within its region of ..

operation and not be capable of making itself capable of interfering with other stations in the region that might operate on the same frequency outside of the station's fringe area where the fringe areas of two stations may meet.

(d.) Ground Radials: This petition suggest that ground radials can be used with the antenna and that they not exceed more than 32 radials at most, this will help the station owner to also forgo the expense of investing in expensive ground radial systems since the number of radials is fixed. The radials shall not exceed that of $\frac{1}{4}$ wavelength ground coaxial length. Which means that the ground forms a coaxial relationship with the ground radial and thus reduces its velocity factor, software and charts shall be consulted to specify the most ideal lengths for specific ground properties.

(e.) Buried Coaxial Cable: Since the coax cable can radiate if an antenna is not properly tuned it is suggested that the coaxial feed cable be run underground from the station exit location to the base of the antenna and its outer shield grounded at the antenna end. This will in effect remove any outer shield radiation from the coax. If needed due to measurements made with sensitive field strength meters that reveal coax shield radiation at the exit point from the station, several toroid ferrite cores can be slipped over the coax cable to attenuate radiation from the coax shield. The coax cable thus needs to be buried in all cases. If a station finds that it has problems locating the coax underground, the applicant has to access their situation and find a means to bury the cable. Hence locating the station on the second or third floor of a building will not do and is not advised.

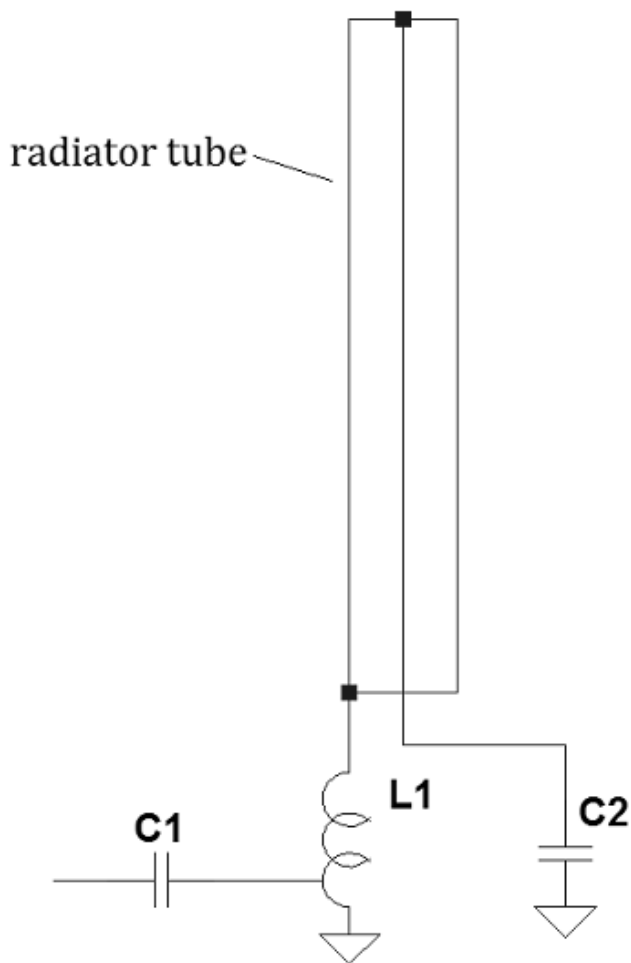
The reason for the buried cable is the same as for not locating antennas high above ground, where we do not want to do anything that can increase the electrical wavelength of the radiator, since it is possible to have the coax radiate and thus add to the electrical length. Raising an antenna up on a mast or tower or atop a building would in effect provide an opportunity for the coax to become radiant if the antenna system is improperly tuned.

(f.) Each station in this service shall employ an adequate low pass filter between the transmitter and antenna to attenuate out of band byproducts. A 5 element low pass filter would be most ideal for this purpose.

(g.) Modulation Monitoring And RF Measurements: Since such things as modulation meters and SWR meters for use on Mediumwave are not commercially available at this time, but oscilloscopes and field strength meters are available it is suggested that a station utilize both of these instruments to make modulation and RF measurements. In terms of an oscilloscope the less expensive types with a bandwidth of 10 MHz or less are all that a station need to invest in which can be obtained for under \$200 in some cases. It is important to be capable of monitoring both the positive and negative modulation peaks of the station transmitter to insure that it is properly adjusted for clean operation. The oscilloscope used in conjunction with the field strength meter can insure that the transmitter and antenna system are properly matched. It is hoped that commercially made SWR meters will come along in time.

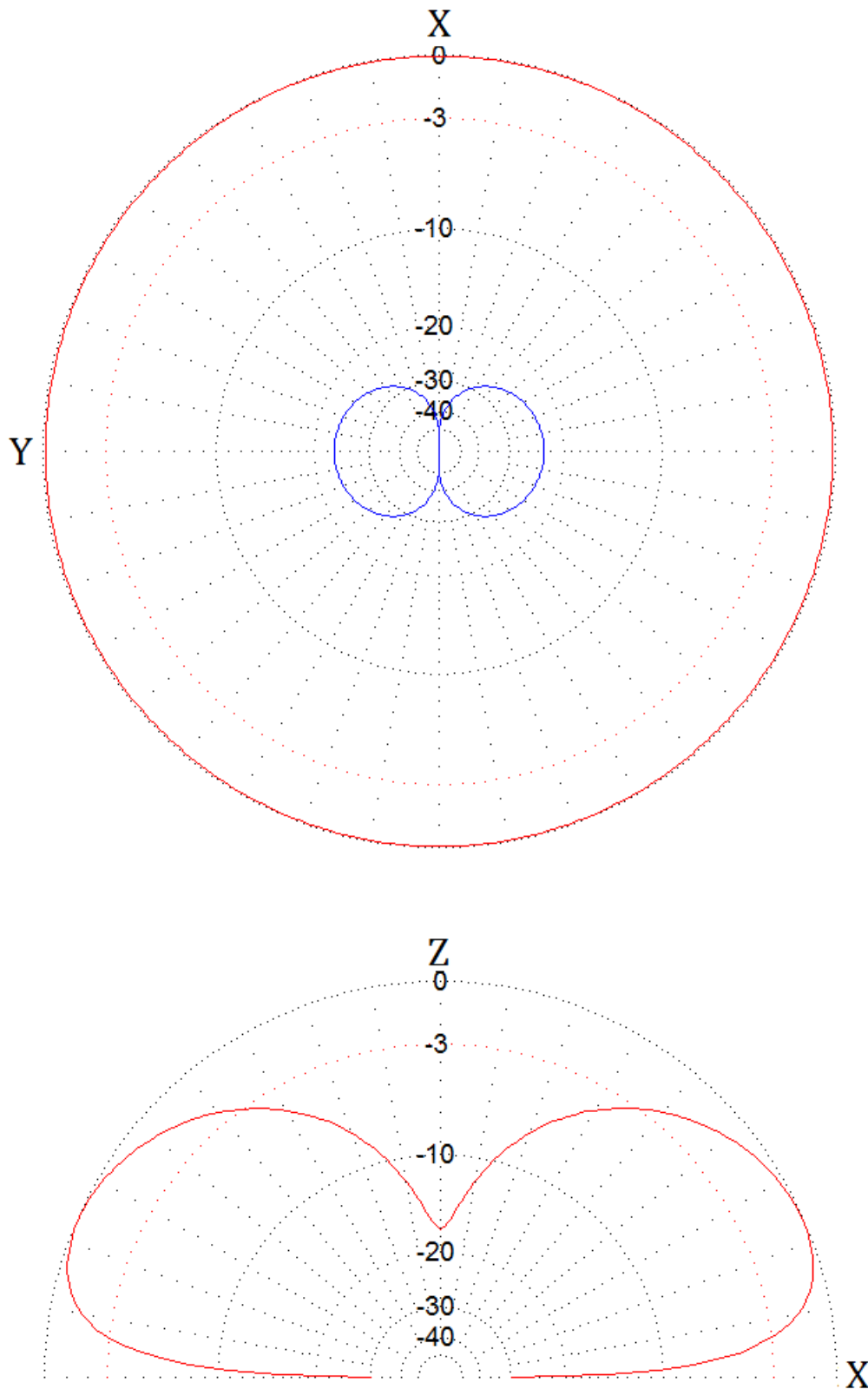
Some digital antenna analyzers may be capable of measuring down into the Mediumwave band and hence can also be used in this service. Companies that make antenna analyzers will no doubt come to add Mediumwave to the band selections of these devices and thus help out such a service. Analog “antenna scopes” such as have been used with amateur radio can also be used in this service as a low cost means to make proper antenna adjustments.

(h.) It is suggested that antennas that can be defined as “folded antennas” be allowed in this service, wherein the return section of the folded antenna can be run down through the inside of a vertical radiator so that this part of the antenna coming from the top of the radiator returns back down inside the antenna in a coaxial fashion and not be capable of radiating. The return shall be connected to a variable capacitor attached to ground to facilitate in tuning the antenna. In a study of such an antenna by the author of this proposal it was demonstrated that such an antenna provided a small amount of H field radiation, and worked much the same way that a capacitance hat works. This antenna was thus invented in software by the author of this proposal as an attempt to improve a Part 15 vision of an antenna that did not violate the specifications, but since this antenna would provide for better tuning of the antenna system with its variable capacitor its use in this service would be ideal in that it would provide better control over the tuning of the antenna to resonance.



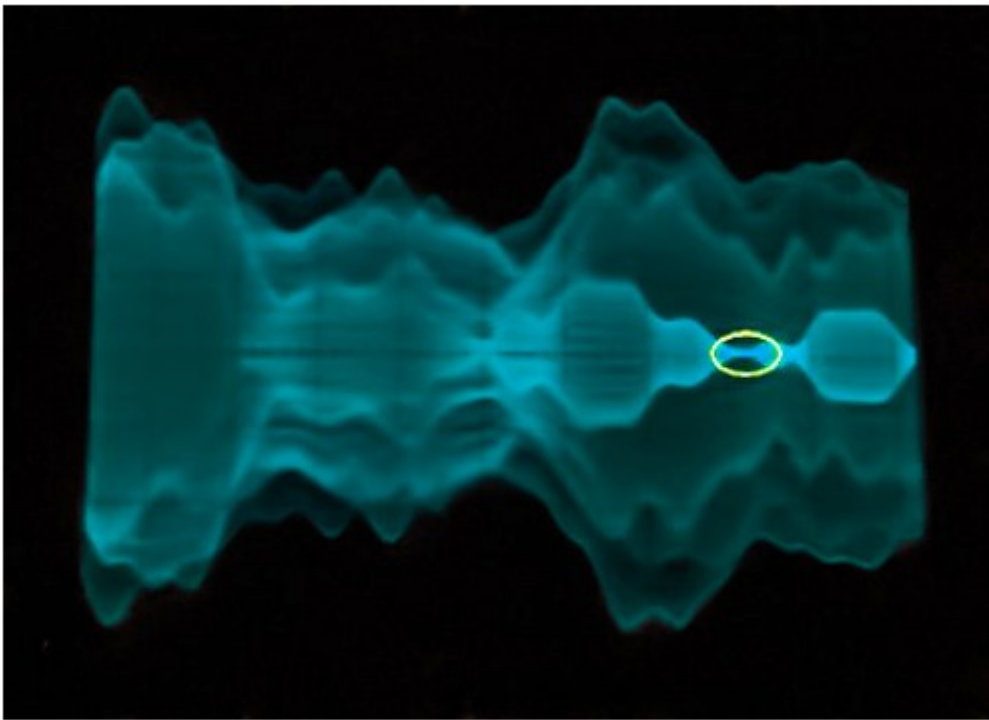
Here we can see the vertical antenna radiator which is tubular with a wire attached to the top which runs down inside the radiator to C2 which is a variable tuning capacitor.

This works much like a capacitance hat but much better in that the tuning capacitor will allow the radiator to be tuned exactly to resonance. This arrangement gives the current in the radiator some place to go instead of seeing the insufficient radiator length. With such short height radiators the current does not run through the radiator completely as it should and does not generate a magnetic or H field but in this case this antenna does.



As can be seen in these plots of the previous antenna, there is a small amount of H field radiation in the center of the top far field plot, which is a view from above the ground looking down. The two small blue colored lobes inside the circular red field (which is the E field) are not present in conventional short height radiators that lack top hat capacitance or that are not folded as this antenna is.

7. Modulation Specifications



It is a tendency for the modulation into a transmitter to clip the negative peaks long before the positive peaks are clipped or flat topped. This can be due to some suppression of the un-modulated carrier and the symmetry of the audio wave forms. As can be seen in the above oscilloscope photograph the positive peaks are still nice and round and hence un-clipped, however in the small circle we can see that there is some negative peak clipping occurring. Given enough clipping of the negative peaks some unwanted spurious products will result just the same as with flat topping of the positive peaks, furthermore it has only been more recently that amateur radio articles have been published to deal with this topic of negative peaks clipping, before recent times you actually did not hear about this being addressed unless you were an engineer or tech in the broadcast radio community. We can address this in this proposed service with some state of the art innovations now available to deal with this.

With modern technology such things as active Op Amp audio filters and methods to control the negative peaks of the modulation through the addition of simple and inexpensive circuitry in transmitters can result in transmitters capable of meeting with some high tech specifications for cleaner operation. With transmitters capable of 15 watts or more (up to 35 watts) there is enough signal level that can be sampled and rectified for use to control the positive peak level of the amplitude modulation.

Recent advancements in such circuit concepts as the commercially available "Mauldulator" Asymmetrical Modulation circuit have led to the adjustment and control of the negative peaks to prevent negative peak clipping which has resulted in the ability to modulate a suppressed carrier to levels that were impossible before except with controlled carrier AM methods. However in terms of levels it should be ...

stated now that no transmitter in this service should use a level above 120 to 125% modulation to prevent unwanted atmospheric background noise from being heard in the transmission which leads to listener ear fatigue. The Mauldulator has found a great following among amateur radio operators as well as CB radio operators. More will be said in this section about the specifications of this circuit as well as a new kind of asymmetrical modulation circuit called the Pro Modulator devised by the author of this text after working with the designer of the Mauldulator to learn its circuit design and operation. The latter or rather Pro Modulator came about as a means to reduce the total harmonic distortion present in asymmetrical modulation, and has active as well as passive filtering to enhance its THD rating.

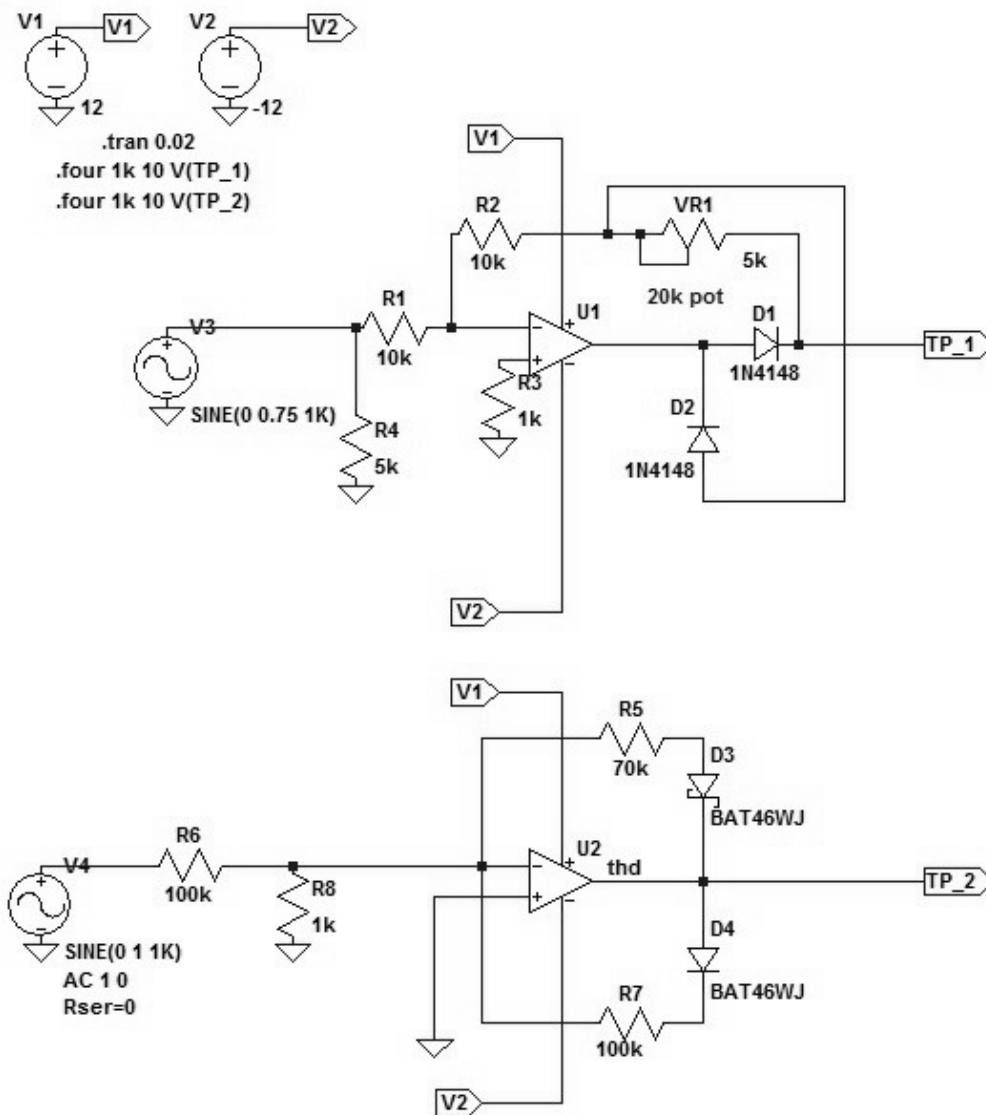
(a.) The first thing of concern with the proposed Low Powered AM Broadcasting Service is the need for establishing some specific performance parameters for modulation and transmitters, first of all the spurious output at these power levels should be the same as that of the amateur radio service in comparison, which are some fairly good specifications. Typically the first harmonic is -43 dB below the fundamental. (Referenced to the standards listed in §97.307 Emission Standards (d.) as the technical standards for modern radio transmitters of the low powered class. And that the spurious products of this service are sufficiently down below causing any interference on the 160 meter amateur band and the 90 meter shortwave band.)

(b.) The modulation bandwidth shall not exceed ± 4.825 kHz and thus remain inside the 10 kHz channel spacing of the Mediumwave band. The bandwidth shall be set either by an active Op Amp audio bandpass filter inside the transmitter or by way of audio filter software. No changes to current channel spacing are suggested and would never be required although some have suggested it, which based upon reading their proposals would lead to some unusual and unnecessary reworking of the band reflecting a lack of understanding radio and what is feasible or rather practical furthermore those schemes resembled the European 9 kHz spacing which make no sense here in the United States.

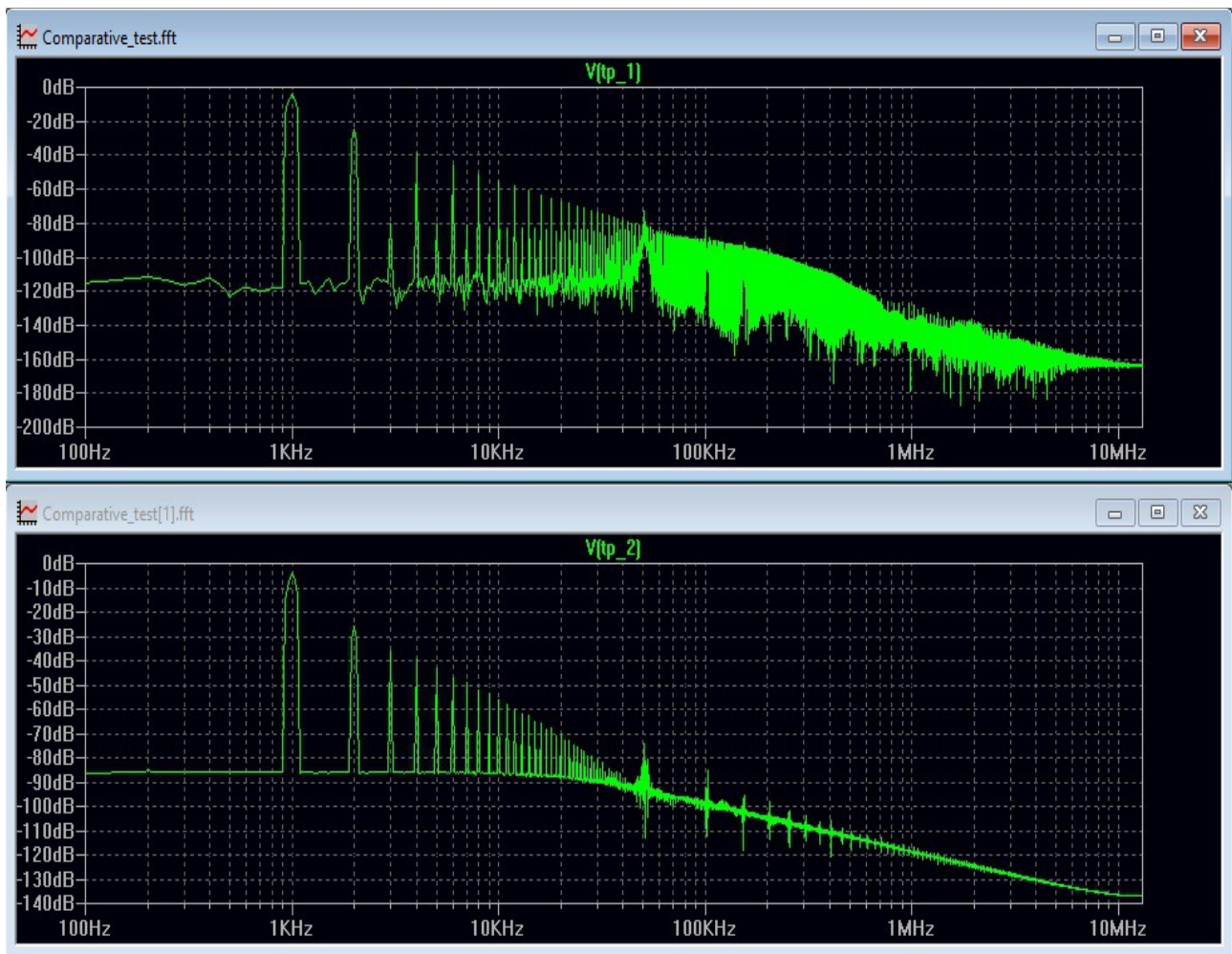
(c.) To prevent negative peak clipping of the modulation, controlled carrier may be used where a suppressed carrier level is automatically adjusted according to the positive peak level which is being sampled by a level control. Or one of the asymmetrical modulation circuits mentioned previously in this section may be employed which will be discussed next herein.

(d.) Mauldulator and Pro Modulator Circuits

On the following page is a circuit diagram of an inexpensive means to adjust and control the negative modulation means, via two circuits that work somewhat the same but differently to accomplish the control of the negative peaks. These circuits are referred to as asymmetrical modulators.



The top circuit diagram built around U1 is the Mauldulator asymmetrical modulation circuit conceived of by John Bartol and designed by his engineering friend David Dowler. This circuit provides control of the amplitude of the negative modulation peak making it separately adjustable as opposed to the positive amplitude peak. The second circuit built around U2 is that designed by the author of this text after working with David Dowler to explore his original circuit concept, where the second circuit named the Pro Modulator was an exploration of means to reduce the total harmonic distortion of the Mauldulator. The Pro Modulator which is unrelated in its function to the Mauldulator method was able to reduce the THD enough to be filtered on out with active and passive audio filtering making it more of a candidate for broadcast quality AM methods. On the next page we will look at the spurious plots of both of these circuits to see the result of the work to provide a better method of asymmetrical modulation for a service such as this one being proposed.



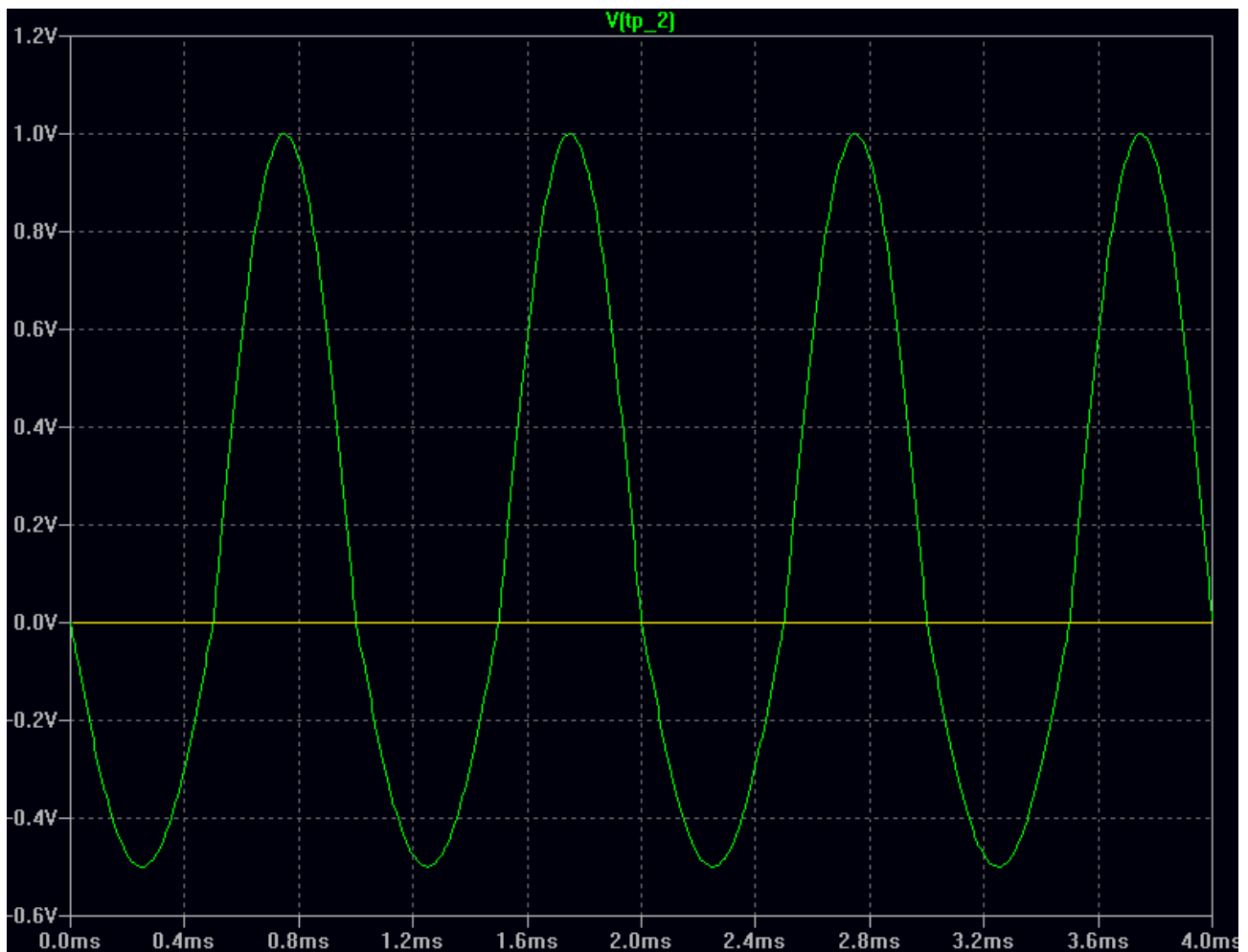
This is the plot of the spurious harmonic content of both of the circuits seen on the previous page, where the circuit diagrams are those taken from LtSpice CAD Spice analysis software. As can be seen in these plots the first circuit sampled at TP_1 definitely is overly rich in harmonic content, while the second circuit (TP_2) has much less harmonic content. The content of both circuits is further reduced with successive stages of active and passive filtering and amplification. For modulation levels of 120 to 125% the total harmonic distortion of the audio is 3% (after filtering) and thus well within reasonably good quality for a low powered broadcasting service.

The harmonic audio distortion increases with an increase in asymmetry.

The performance of the second circuit makes it the more likely candidate for use while the first circuit can operate reasonably well if filtered and not used for modulation beyond 125% which we would not want to use anything beyond this amount for any reason.

On the next page we will briefly look at a plot of asymmetrical audio and how these circuits work to reduce the negative peak amplitude, please remember that the circuits are adjustable using potentiometers in the circuits; where in the first circuit one potentiometer is used, however in the second circuit both R5 and R7 are adjustable ...

although the diagram shows them to be fixed which was to remember what values where plotted to be best for these test.



This plot shows the effect of asymmetrical modulation with reference to the positive and negative sinewave amplitude being compared to the zero axis or 0.0V scale. As can be seen the positive amplitude is 1V while the negative amplitude has been adjusted to 0.5V and hence is $\frac{1}{2}$ the amplitude of the positive going peaks. *This is an extreme example since we would want the negative peak to be 0.75 to 0.80 Volt.*

Coupled with control of the positive modulation peaks via an Automatic Level Control, and the use of either of these circuits, some extreme specifications can be met that result in extremely clean operation within this proposed Low Powered AM Broadcasting Service. The technical specifications can thus meet with some unexpected performance capabilities that any naysayer for this kind of service would have to admit exceeds their concerns.

The summation of this is that we can have such a service where the equipment will never clip either the positive or negative peaks of the modulation and hence provide for some extreme performance that no one has previously conceived of for use with a suggested Low Powered Broadcasting Service. As an aid to this service, the author is the first person to make Spice analysis files of the Mauldulator and designed and

perfected the Pro Modulator using LtSpice for both circuit designs. These files are available for those who want to research their performance through software analysis.

It should also be stated that if a vacuum tube RF amplifier is to be modulated with this type of modulation, it is best to suppress the carrier via the suppressor grid and then apply the modulation to the suppressor grid which will provide the intended performance once all of the adjustments are made to the asymmetrical modulation section. RF transistor amplifiers are modulated via means of a Darlington pair of transistors in series with the RF amplifier transistor, where the asymmetrical modulation is fed to the Darlington pair.

Asymmetrical modulation techniques are not new to AM Broadcasting as can be seen through some search of the topic on the Internet, what is new are these circuits where the Mauldulator is currently a commercially available product for amateur radio as well as CB radio use and has proved to work quite well according to its purposes.

8. FCC Revenue For Man Power To Maintain This Service

Because of various matters of concern, such as crowded channel usage in dense cities, and as a means to generate FCC revenues for this service the power level of such stations can be specified for 15, 20 or 35 watts depending upon the location of the station, and hence this is a suggestion to ponder. Since in large cities it might be a problem within larger populations which can have more applicants due to the larger population density, therefore the power level for such dense regions can be limited to 15 watts. 35 watts would then be utilized within small towns and rural communities outside of the densely populated regions. In turn antenna height in such dense regions can be limited to 6 meters. A change of location for a station, were the licensee must retain the previous license and call signs, would be made as a filing with a fee, and hence if there are any power class or antenna height changes that can be made because the move maybe to a rural region, the station must also make a filing with a fee in order to provide FCC revenue for man power to maintain the service.

Additionally a starter class of service may be specified for new station license where the antenna height is limited to 6 meters. After the initial first year an antenna change permit may be filed for, with a specified fee to upgrade to a 9 meter antenna. All license applications, renewals and upgrades will have a specified fee for revenue purposes to fund the FCC's maintenance of the service. After the initial one year starter class license renewal stations should only have to update their antenna and then renew their license every two or perhaps four years, which is left up to the FCC to determine.

The FCC may want to consider various means to acquire revenue for this service, although some revenue may come from the government, licensing and other fees should be considered and how those fees should be divided up in terms of what kind of fee and how many fees can be produced to make funding of the service feasible.

9. Preparing For Such A Service

The would be station owner would have to be able to prove some level of proficiency in understanding the basic concepts of radio transmitter operation such as how to compute power output, how to compute RF micro volts per meter, how to monitor modulation peaks, as well as be knowledgeable of RF output filters and antenna design and tuning. In addition they should understand channel audio bandwidth and the means to adjust it to prevent adjacent channel interference (bleed over). A suitable handbook for this purpose can be written and recommended to would be station license applicants. Where quite a few individuals would write such publications as their personal service, This however should not mean that the applicant must appear somewhere in person to take test but affirm that they have read a publication and specify the name and author of the authorized list of publications which is an indication that they have been doing their homework. Additional proof that they have read the publication can be made in the form of a few questions on their mail in application that they can answer, such as to compute an equation for micro volts per meter and thus submit this on the application which can be mailed. Furthermore to keep all of this adult and serious, the applicant needs to be 20 years old in order to maturely operate the station and understand the responsibility of it. ~ Because of this reality, it should also be a rule that no one on such stations should be allowed to use profanity, nor use their station to make terroristic threats.

In this service no doubt there will be many amateur radio operators interested in such stations or helping interested individuals to set up as well as understand the proper operation of such stations. So there will be a community of technically able individuals who can come to the aid and assistance of such stations to set up, launch and help maintain them.

10. An Alternative Service

~ If There Are Problems With The First Vision Of This Proposal. Another arena of interest shared by many low powered AM advocates are some changes that can be made to the Part 15 vision of unlicensed broadcasting.

An alternative to be taken into consideration would be as follows, wherein some changes can be made within the Part 15 class of operation on the Mediumwave band. Where suggested new rules can be made for unlicensed broadcast stations that will operate within the Rural Band segment of 1600 kHz to 1710 kHz only.

The changes required to up date this service are based upon modern state of the art electronics technology where such things as coax cable should be used between the low level transmitter and antenna, where immediately leaving the station the coax is run under ground to the antenna location. And these suggested changes shall only apply to radio stations that are not being used as transmitters for bill board signs or for street advertisements from stores etc, but for use only by low powered stations

operating as a conventional radio broadcast station that carry music and other programming.

The rule making changes should then allow for the use of coax cable that is run underground to the antenna site, where the antenna is still the 3 meter height specified by Part 15. However it should be taken into consideration to either allow for an antenna of 6 meters height, or for an increase in power output from the transmitter on the order of somewhere between 200 to 500 mW into the coax cable going to the antenna. Some people have suggested that they would be satisfied if only coax were allowed and an antenna height of 6 to 9 meters were allowed with no change in specified power. Where the antenna must be mounted vertically on the ground and may not be raised up upon a mast, neither tower nor atop any building structure.

Furthermore with regards to concerns about the above ground portion of coax cable leaving the station going into the ground, if round toroid ferrite cores are slipped over this portion of cable at about every one foot or less of exposed cable, to act as RF chokes, this will in effect choke off RF current that may run along the outside of the cable's outer shielding. Coupled with the choking action of the dielectric of the ground surrounding the coax cable portion that is buried, the system can in no wise be considered a part of the radiator of which is the reason coax cable is used since it effectively shields losses in most cases. This is a simple state of the technology solution.

In addition those who support changes to Part 15 for Mediumwave have an interest in using antenna capacitance hats to effect a better radiator current flow because of which short height radiators are notorious for such lack. And if considered, the type that should be used is a circular metal disc atop the radiator. Since wire types of capacitance hats can be made into radiator lengthening devices disguised as capacitance hats, specification of metal disc only will eliminate any attempt to lengthen the radiator in a disguised fashion. In addition the ability to use the folded antenna design (previously discussed) of a specified height for Part 15 should be allowed.

And finally the new vision for Part 15 can include the use of asymmetrical modulation circuits to insure that the signals are kept as clean as possible. And again this alternative definition for Part 15 applies only to stations that are operating as a conventional broadcast station and may not apply to any other use for which Part 15 is also used for such as road side sign transmitters and store advertisement transmitters otherwise this would no doubt be abused by the electronics manufacturing industry where such devices and use must operate according to Part 15 specifications in existence at this current time and continue with those specifications.

It should be mentioned that since Part 15 broadcasting involves some special considerations that are not encountered in Amateur radio nor CB radio such as the use of extremely short height antennas with a very low radiation resistance, and the means and methods required to tune and maximize the efficiency of an very inefficient antenna, whereas Part 15 broadcasting is not something that will be under took just by anyone. Its use would not be widely invested in due to its nature.

Those who do undertake to utilize Part 15 unlicensed broadcasting do so through some study which is required to undertake the task of making sure they properly build an antenna that can actually be tuned to resonance.

Furthermore, if this is considered, it should also be suggested that for a transmitter to be type accepted for this special class of Part 15 for “conventional radio broadcasting” should include some means to measure the modulation and or the power output, such as by the use of meters either within the transmitter or external to it. Hence the type accepted transmitter would be specially manufactured and its circuit submitted to the FCC, or someone may build a circuit that has been type accepted. A fee could be applied to have a circuit submitted and reviewed, but that fee shall never be considered by the applicant as a means to obtain type acceptance only as the means to have it reviewed for acceptance and thus pay for the processing.

If the first vision of this petition is considered to be infeasible at this moment in time. Making changes to the Part 15 class of operation would make quite a few people happy based upon some of the comments and views of people encountered since 1998 onwards.

11. Summary Comments

The following is based upon all of the previous suggestions for rule making: The purpose and vision for the need of a Low Powered AM Service in this proposal for rule making is believed to be concise and clear enough to understand the vision of those who believed they have been disenfranchised by corporations virtually owning the radio and television landscape, as well as by not being eligible for a Low Powered FM license of which non profit corporations are eligible.

<https://www.fcc.gov/consumers/guides/low-power-fm-lpfm-radio>

Whereas those interested in Low Powered AM believe that this proposed new service can be of an entirely different nature than the Low Powered FM service and should not be modeled after it nor based upon the vision of the FM service.

The suggestions for power and antenna height are considered to be feasible for this service, and such that the recommendations will lead to a service that will not create complications for the rest of the broadcast community, that shares the Mediumwave band. In addition imposing certain technical standards on the service through new technology means, will help to insure that the service runs clean and causes no interference to anyone concerned.

Furthermore the FCC can consider how to run this service, with regards to using it to obtain revenue to fund the man power for the service, and apportion license and other fees sufficient enough to provide adequate revenue, as well as creating reasonable fines for gross violations of the rules and regulations created for the service. Where a notice of violation should precede any final action to give a station time to correct any ..

rule infringement or technical violation. Failure to pay a fine in due time will result in license suspension, but renewed again once the fine is payed. And again neither the broadcast of profanity nor terroristic threats are allowed in this service. Where a terroristic threat will lead to license suspension forever afterward, while such an act would also lead to legal actions within other jurisdictions if interested parties so chose to pursue the matter.

It is the hope of he who drafted this proposal and those who submitted it, and continue with the proceedings and processes, that this proposal sparks some thought and interest within the FCC in creating such a service as is proposed herein. And or may cause a review of the Part 15 vision so that some changes can be made to accommodate the interest of would be broadcasters who would find an update to Part 15 allowing for some changes only for the purpose of creating a micro powered broadcast station that is not involved in providing road side sign or store advertising.

Furthermore, it is also possible to create a Low Powered AM Broadcasting Service and in turn make changes to Part 15 to create something altogether new in Mediumwave that can come to define the future of AM and lead to the creation of new higher powered stations, as people move on from low power to higher powered operations and or, lead to innovations that will help the Mediumwave Broadcast Service altogether. With digital technology as well as software defined radio and such things as DRM, the low powered service as well as a new vision for Part 15 broadcasting can lead to a base from which testing and research can be done in regions with audiences through low powered means and thus enable research into new frontiers in AM broadcasting which can come to include better methods of digital broadcasting. Although this is not the prime purpose for suggesting this service it however can provide more purposes than one.

If anyone wants more detailed information about the circuits mentioned in this proposal they may contact the author using the information on the first page, LtSpice files of complete circuits are available. The Pro Modulator has limited information available at this time due to some proprietary circuit features.

For those who are not familiar with asymmetrical modulation there is a video that you can watch the explians what it does. Please remember that with such modulation is a suppressed carrier.

<https://www.youtube.com/watch?v=dLNo7F5F1Cs>

Rembmer that the Mauldulator is the product of John Bartol and David Dowler, the Pro Modulator is the product of Dannie Jackson, active and low pass filtering circuits for both products are the products of Dannie Jackson.

End Of Rule Making Proposal:
For A Low Powered AM Broadcasting Service